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Particle motion in spatio-spectrally iso-diffracting ultrabroadband pulsed beams

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An analytical form is derived using the Faddeeva function to represent terahertz-frequency pulses generated by optical rectification of ultrashort laser pulses. Spectra of these pulses can be described by a Gaussian fall-off at high frequencies and a power-law as DC is approached. A set of pulsed beams based on this form is also derived for the special case of propagation-invariant spatio-temporal coupling (iso-diffracting). Motion of charged particles in these pulsed beams is considered analytically and numerically and energy gain is computed and compared with ponderomotive force laws. Particle motion in more complex pulsed-beam fields is also considered.

Footnotes

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North America

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